Acta Arachnologica, 64(1): 21–25, August 31, 2015

A redescription of *Rhacochelifer melanopygus* (Redikorzev 1949) (Pseudoscorpiones: Cheliferidae), a new record of pseudoscorpion fauna of Iran

Mahrad Nassirkhani* & Reza Vafai Shoushtari

Entomology Department, Faculty of Agriculture and Natural Resources, Islamic Azad University, Arak branch, Arak, Iran
**Corresponding author. E-mail: greenartificialturfgrass@gmail.com*

Abstract — A total of twelve species belonging to the family Cheliferidae have been reported previously from Iran. *Rhacochelifer melanopygus* (Redikorzev 1949) is newly recorded from Iran, and measurements and illustrations of this species are given.

Key words — Arachnida, fauna, geographical distribution, habitats

---

Introduction

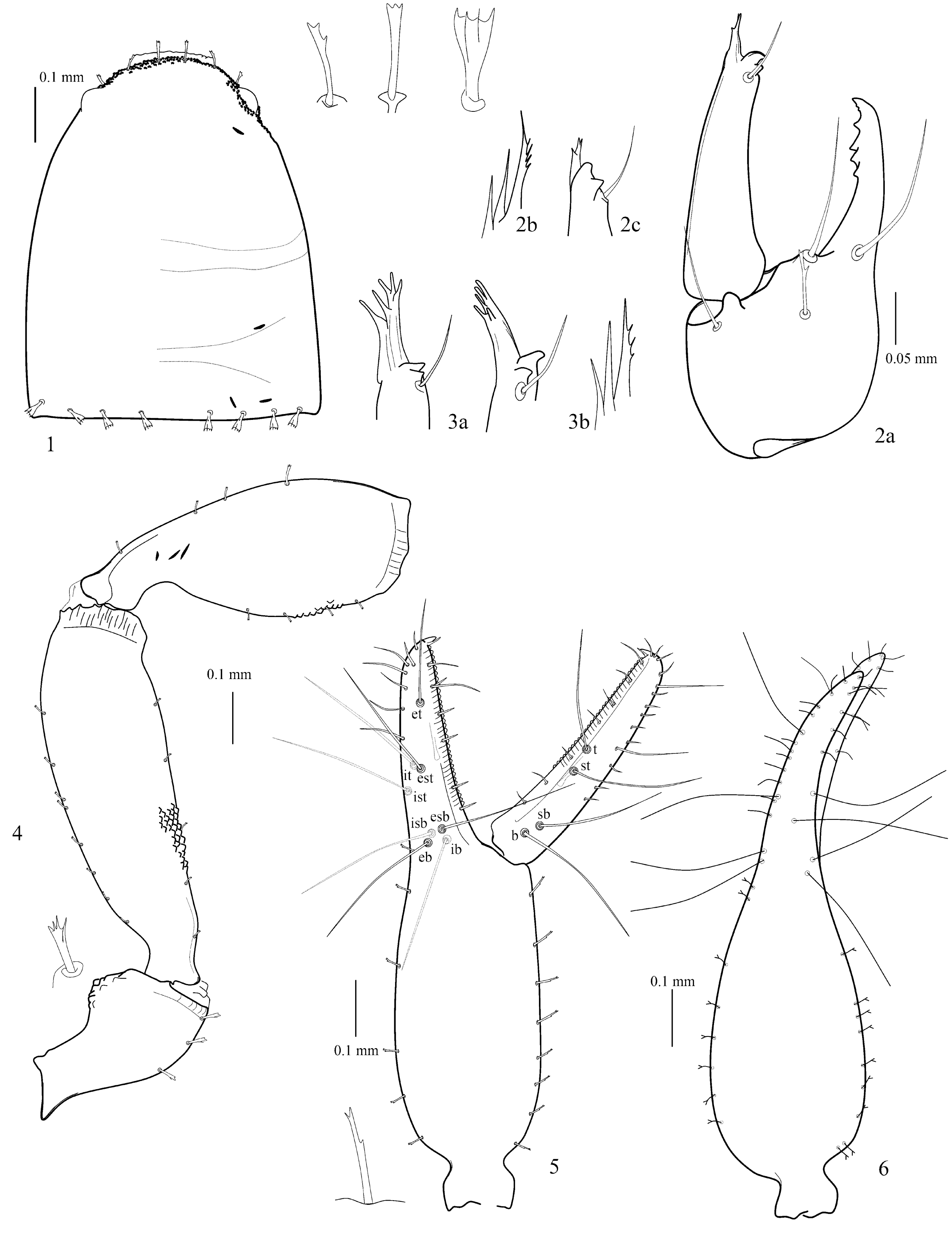
The family Cheliferidae which consists of 273 known species belonging to 58 genera, is one of the large families of pseudoscorpions all around the world (Harvey 2013), Nonetheless only 12 species belonging to 5 genera have been reported from Iran: *Strobilochelifer spinipalpis* (Redikorzev 1918), the first species of the family recorded from the south-eastern part of Iran (Redikorzev 1918), *Dactylochelifer kussariensis* (Daday 1889) from Tabriz and Karaj Cities (Beier 1951, 1971), *D. gracilis* Beier 1951 from Kerman Province (Beier 1951), *D. latreillei* (Leach 1817) from Guilan Province (Mahner 1974), *D. intermedium* Redikorzev 1949 from Lorestan and Markazi Provinces (Nassirkhani & Vafai Shoushtari 2014), *D. mrciaki* Krumpál 1984 from Fars Province (Nassirkhani & Vafai Shoushtari 2014), *D. brachialis* Beier 1952 and *D. spasskyi* Redikorzev 1949 from Kerman Province (Nassirkhani & Takallo zadeh 2012, 2013b), *Ellingsenius fulleri* (Hewitt & Godfrey 1929) from Shiraz City on *Apis mellifera* (Judson 1990), *Gobichelifer chelanops* Krumpál 1979 from Kerman Province (Nassirkhani & Takallo zadeh 2013a), *Hysterochelifer afghanicus* Beier 1966 from Hamedan, Tehran and Tabriz Cities (Beier 1971) and *Strobilochelifer gradimanus* Beier 1943 from Bandar-e-Abbass City (Beier 1971).

Many species of cheliferid pseudoscorpions especially those have been reported from Central Asia and the Middle East are poorly characterized and briefly described. For example, *Rhacochelifer melanopygus* (Redikorzev 1949), which is the senior synonym of *R. mongolicus* Beier 1969 (Dashdamirov & Schawaller 1995), was originally described under the genus *Lophochernes* by Redikorzev (1949) from Uzbekistan. In the original description, five setae are found on the cheliceral hand and simple sub-terminal setae are present on all tarsi, whereas the examination of the type by Dashdamirov & Schawaller (1995) revealed that only four setae are present on the cheliceral hand and each tarsus has bifid sub-terminal setae. Additionally, because of the absence of a tactile seta on the tarsus IV and the presence of slightly clavate setae on the carapace, tergites, and pedipalps, Dashdamirov & Schawaller (1995) transferred this species to the genus *Racochelifer* and they gave a short redescription of *R. melanopygus* based on the materials from Tajikistan. Here, the species is completely redescribed and illustrated on the basis of the newly collected specimens from Iran with some notes on the ecological habitats.

Materials and methods

The specimens were cleared by 60% lactic acid solution at 45°C temperature and the pedipalps, chelicera, and legs I and IV were removed from the body. The dissected parts and the body were mounted in Swan's fluid on a glass-microscope slide and covered with a coverslip. All specimens were studied by using an Olympus BH-2 compound microscope and illustrated by a drawing tube attached to the microscope. Measurements were made with the aid of an ocular graticule. Terminology and mensuration follow Chamberlin (1931), Harvey (1992), Judson (2007), and Harvey et al. (2012). The specimens examined for this study are lodged in the collection of the Acarology Laboratory, Islamic Azad University of Arak (IAUA), Iran.

The following trichobothrial abbreviations were employed: *eb*=external basal; *esb*=external sub-basal; *ib*=internal basal; *isb*=internal sub-basal; *ist*=internal sub-terminal; *est*=external sub-terminal; *it*=internal terminal; *et*=external terminal; *t*=terminal; *b*=basal; *sb*=sub-basal; *st*=sub-terminal. The following abbreviations are also used: mm=millimeter; L=length; W=width.



Figs. 1–6. *Rhacochelifer melanopygus* (Redikorzev), male. 1, carapace, dorsal view (showing transverse furrows and type of setae); 2a, chelicera (serrula omitted); 2b, rallum; 2c, galea; 3a, galea (♀); 3b, rallum (♀); 4, pedipalp; 5, right chela, ventral side (showing trichobothrial pattern); 6, right chela, dorsal aspect.

Family Cheliferidae Risso 1827
Genus *Rhacochelifer* Beier 1932
Rhacochelifer melanopygus (Redikorzev 1949)
Figs. 1–10

Lophochernes melanopygus Redikorzev 1949: 662–663, figs. 27–29.

Material examined. Four ♂ [MNP14FS117], two ♀ [MNP14FS121], moisture decayed litter, Mountain Park, Shiraz, Fars Province, IRAN, July 6, 2014, coll. M. Nassirkhani (IAUA).

Description of Adults. *Carapace*: blackish brown; entirely granulate, without coarser granules; hind corners without knob-like enlargement; longer than wide, L/W 1.16–1.24 (♀1.27–1.31); with two well-developed corneate eyes; two transverse furrows present, anterior furrow situated submedially and slightly curved distally in the median zone, posterior furrow wider than anterior furrow, straight and expanded to lateral margins (Fig. 1); anterior margin with six setae, four setae situated on anterior border, two median setae with three terminal denticulations and two sub-median setae with two terminal and one (two?) sub-terminal denticulations, and one pre-ocular seta situated on each side; posterior margin with 8–12 setae, all stout and dentate; preocular seta shorter than setae on anterior border; with 4–5 distinct lyrifissures, anterior pair situated slightly posterior to eyes (in one specimen, situated anterior to eyes and second pair situated posterior to eyes), one pair situated very close to posterior furrow and two last pairs situated on posterior margin (Fig. 1).

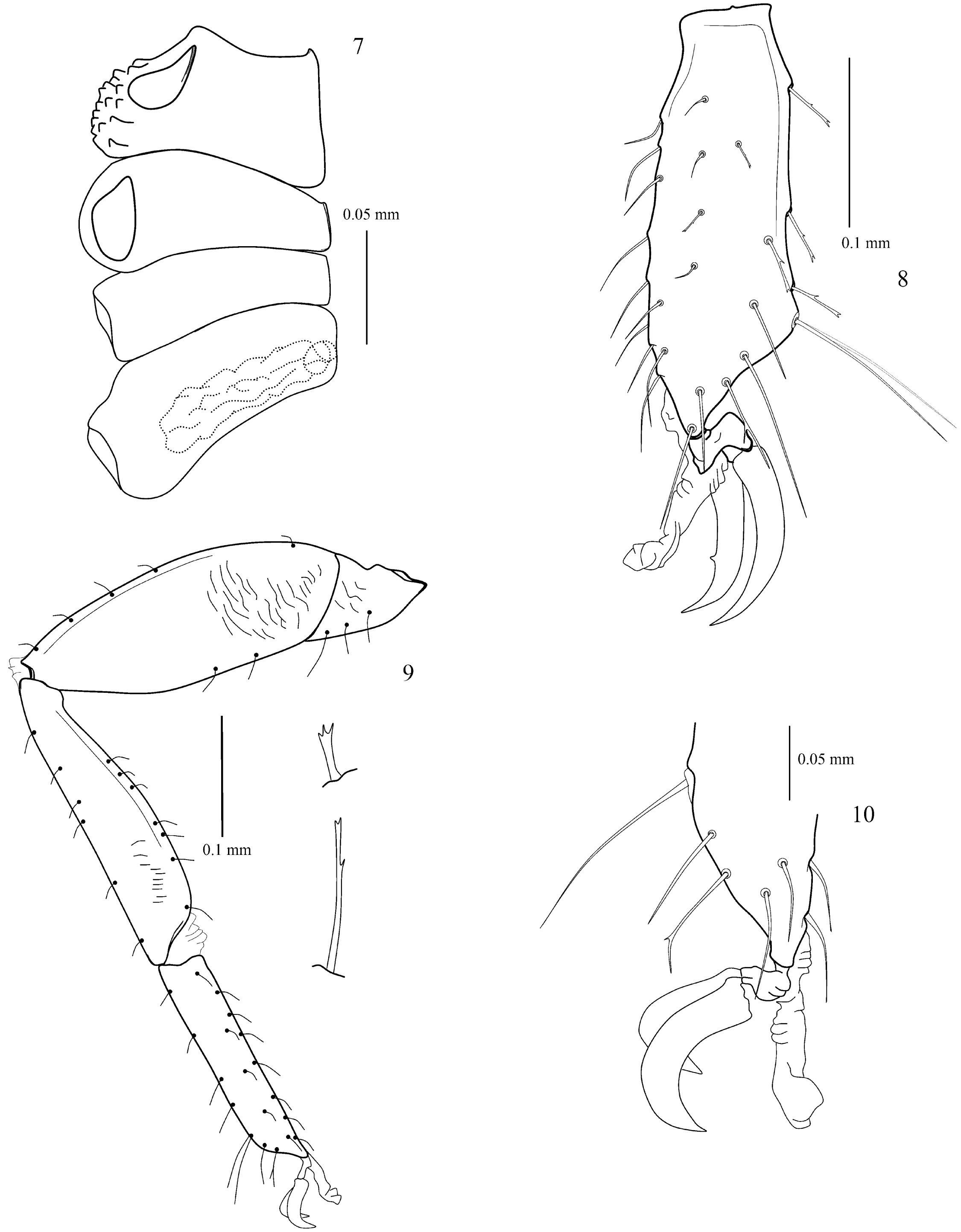
Tergites: dark brown, anteriors distinctly lighter in colour than carapace; heavily sclerotized and distinctly granulate; without spine-like keels on lateral hind; I–X divided by narrow and obvious median suture line, XI undivided or incompletely divided; I–III with uniserate setae, IV–X with two lateral and two median discal setae, central discal setae absent, XI with regular setae arranged on posterior border; XI with two long tactile setae situated laterally; setae on anal membrane longer than sternal setae on that; all setae with terminal denticulations; with setae arranged: 10–11: 10: 9–11: 11–13: 13–16: 14–17: 13–17: 14–17: 11–16: 7: 2 in males and 9–10: 12: 10–11: 12: 15: 13–18: 14–16: 15–17: 14–15: 11–15: 6–8: 2 in females.

Sternites: brown, lighter in colour than tergites; slightly sclerotized and entirely smooth; I absent; II and III deformed and made anterior and posterior operculum, anterior operculum with 23–28 setae, central setae bifid and posterior operculum with 8–10 simple setae, four setae situated behind male genital opening; females with simple setae on anterior and posterior operculum; male genital apodeme normal; females with median unpaired mushroom-shaped cribriform plate with large pores; IV–X distinctly divided by median suture line, XI not divided; X with two slightly long setae situated sub-medially; XI with two long tactile setae situated sub-laterally; with setae arranged: 23–28: (0)8–10(0): (1)6(1): 9–10: 9–10: 9: 9–10: 8–11: 10–11: 7: 2 in males and 10–14: (0)6–8(0): (1)7–8(1): 8–10: 10: 9–10: 9–11: 9–12: 10–11: 8–9: 2 in females.

Chelicera: brown; galeal seta present; galea with 3–4 small rami in males (three apical and one sub-apical) (Fig. 2c) and 5–6 distinct rami in females (three apical, one or two sub-apical and one median rami) (Fig. 3a); hand with four setae, basal seta with two median and two apical denticulations (Fig. 2a); rallum with three blades, distal blade longest with lateral denticulations (Figs. 2b, 3b); serrula exterior with 16–17 blades; lamina exterior presents; fixed finger with 6–7 teeth, two or three apical teeth short and acute; movable finger with one curved apical lobe and one sub-apical tooth.

Pedipalps: blackish brown, fingers lighter in colour than hand, trochanter, femur and patella; heavily granulate and chelal hand finely granulate; femur and patella without coarser granules on prolateral margin; most setae short, apically dentate and indistinctly, hand with thinner setae, fingers with simple and long setae; trochanter with two dorsal humps, each hump with a distinct coarse granule (Fig. 4); femur elongate, with distinct pedicel, L/W 2.32–3.31 (♀3.22–3.30); patella with distinctly curved pedicel, L/W 2.42–2.56 (♀2.36–2.61); patella with three lyrifissures, distal one longest (Fig. 4); chela with distinct pedicel (Figs. 5, 6); chela (with pedicel) L/W 3.61–3.90 (♀3.54–3.64); chela (without pedicel) L/W 3.39–3.69 (♀3.29–3.33); hand (with pedicel) L/W 2.19–2.35 (♀2.13–2.27); movable finger distinctly shorter than hand with pedicel; hand (with pedicel) 1.34–1.62 (♀1.35–1.44) longer than movable finger; fixed finger with 8 and movable finger with four trichobothria (Fig. 5); fixed finger with trichobothrium *et* located slightly closer to tip of finger than to *est*, *est* situated sub-medially, *it* situated approximately at same level as *est*; *ist* located slightly proximal to *est*, *eb-esb-ib-isb* aggregated basally; movable finger with trichobothrium *t* situated in distal half on finger, *st* located closer to *t* than to *sb*, *sb* located clearly close to *b*; fixed finger with 31–37 (♀36) cusped teeth; movable finger with 26–31 (♀30–33) cusped teeth which becoming dim basally; venom ducts elongate in both fingers; nodus ramosus situated distinctly proximal to *est* or at same level as *est* in the fixed and at same level as *st* or between *st* and *sb* in the movable chelal finger.

Legs: brown, distinctly lighter in colour than body; slightly sclerotized and finely granulate; coxal setae arranged: 6: 6: 10: 28 (only for one specimen can be counted) for males and 4: 4: 5–6: 22–27 for females; male coxa IV with well-developed atrium and long coxal sac about two thirds of coxal length (Fig. 7); all segments without tactile setae; sub-terminal setae bifid (Fig. 10); arolia simple; *Leg I*: femur L/D 1.83–2.00 (♀1.75–1.77); patella L/D 2.73–3.00 (♀2.67–2.72); tibia L/D 2.80–3.11 (♀3.33–3.50); male tarsus I deformed and stout, both margins nearly parallel, retrolateral margin with slightly rounded apical corner, prolateral margin with simple and retrolateral margin with



Figs. 7–10. *Rhacochelifer melanopygus* (Redikorzev), male. 7, right coxae (setae omitted and showing coxal sac with well-developed atrium); 8, tarsus I; 9, leg IV (trochanter omitted); 10, claws, arolium and sub-terminal setae of leg IV.

dentate setae, claws asymmetric, stout claw with one median large tooth (Fig. 8), L/D 2.77–3.12; tarsus I of females elongated normally, L/D 4.00–4.50. *Leg IV*: femur L/D 1.54–1.63 (♀1.58–1.61); patella L/D 2.70–2.82 (♀2.94–3.00); femur+patella L/D 3.27–3.47 (♀3.66–3.69); tibia L/D 4.50–5.00 (♀4.45–4.50); tarsus apparently shorter than tibia, most setae with one lateral and a few terminal denticulations; L/D 4.57–5.33 (♀4.71–5.00), claws symmetric (Figs. 9–10).

Dimensions (in mm for males). *Body length*: 2.02–2.17; *Carapace*: 0.65–0.71/0.53–0.60. *Pedipalp*: trochanter 0.32–0.35/0.18–0.21; femur 0.66–0.80/0.20–0.22; patella 0.55–

0.64/0.22–0.26; chela (with pedicel) 1.02–1.12/0.26–0.31; chela (without pedicel) L. 0.96–1.05; hand (with pedicel) L.0.61–0.68; movable finger L. 0.42–0.50. *Leg I*: trochanter 0.12–0.15/0.10–0.11; femur 0.22–0.24/0.11–0.12; patella 0.29–0.31/0.10–0.11; tibia 0.28–0.29/0.09–0.10; tarsus 0.25–0.26/0.08–0.09. *Leg IV*: trochanter 0.23/0.12; femur 0.16–0.18/0.10–0.11; patella 0.44–0.49/0.16–0.18; femur＋patella 0.57–0.59/0.16–0.18; tibia 0.42–0.47/0.09–0.10; tarsus 0.32–0.35/0.06–0.07. For females: *Body length*: 2.52–2.67. *Carapace*: 0.75–0.80/0.57–0.63. *Pedipalp*: trochanter 0.35/0.19–0.22; femur 0.71–0.76/0.22–0.23; patella 0.59–0.68/0.25–0.26; chela (with pedicel) 1.10–1.20/0.31–0.33; chela (without pedicel) L. 1.02–1.10; hand (with pedicel) L.0.66–0.75; movable finger L. 0.49–0.52. *Leg I*: trochanter 0.16/0.12; femur 0.21–0.23/0.12–0.13; patella 0.30–0.32/0.11–0.12; tibia 0.28–0.30/0.08–0.09: tarsus 0.27–0.28/0.06–0.07. *Leg IV*: trochanter 0.22–0.25/0.12–0.14; femur 0.19–0.21/0.11–0.13; patella 0.48–0.53/0.16–0.18; femur＋patella 0.59–0.66/0.16–0.18; tibia 0.45–0.49/0.10–0.11; tarsus 0.33–0.35/0.07.

Remarks. On the basis of the morphometric characters, the newly collected specimens from Iran have more similar appearance to the type which was originally described from Uzbekistan by Redikorzev (1949) than to the Tajikistani materials those were reported by Dashdamirov and Schawaller (1995), e.g. the ratio of the pedipalpal femur is 0.70/0.19 mm, tibia is 0.60/0.20 mm and the movable chelal finger L. is 0.50 mm for the type (Redikorzev 1949). The ratio of the male tarsus I in *Rhacochelifer melanopygus* (Redikorzev) is the obvious difference between the specimens from Tajikistan and the newly collected specimens from Iran, e.g. it is 0.34/0.07 mm for the Tajikistani specimens (Dashdamirov & Schawaller 1995). Also, the nodus ramosus in the both chelal fingers of the Iranian materials is distinctly longer than those of the specimens from Tajikistan judging from Fig. 38 in Dashdamirov & Schawaller (1995). The L/D of the male tarsus I of *R. mongolicus* Beier which is considered as a junior synonym of *R. melanopygus* is 0.26–0.28/0.07–0.08 mm (Beier 1969; Krumpál 1984) that is slightly longer than that of the materials from Iran. The species is distributed around Kazakhstan, Mongolia, Tajikistan and Uzbekistan (Harvey 2013) and now, is recorded for the first time from Iran.

The most specimens belonging to *R. melanopygus* were collected from under bark of almond, apple and willow trees (Redikorzev 1949), a nest of *Passer* sp. (Krumpál 1984), and under bark of *Pistacia vera* (Dashdamiriv & Schawaller 1995). In the present case, the materials were found in moisture litter consisting of *Platanus* sp. and *Ulmus* sp. leaves and barks in addition to graminaceous botanic material. These substances were located in the outer side of a stream canal within a mountain park.

Acknowledgements

The authors wish to thank the Vice Chancellor of Research and the Faculty of Agriculture at Islamic Azad University of Arak, Iran for their supports for this research, Dr. Christoph Hörweg for providing the literature and wish to express their sincere thanks to Mr. Mahmoud Nassirkhani for his assistance

References

Beier, M. 1932. Pseudoscorpionidea II, Subord. C. Cheliferinea. Das Tierreich, Berlin, xxi＋259 pp.

Beier, M. 1951. Ergebnisse der österreichischen Iran-Expedition 1949/50, Pseudoscorpione und Mantiden. Ann. Nat. Mus. Wien, 58: 96–101.

Beier, M. 1969. Pseudoscorpionidea. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei. Reichenbachia, 11: 283–286; Dresden.

Beier, M. 1971. Pseudoscorpione aus dem Iran. Ann. Nat. Mus. Wien, 75: 357–366.

Chamberlin, J. C. 1931. The arachnid order Chelonethida. Stanford Univ. Publ., Bio. Sci, 7: 1–284.

Dashdamirov, S. & Schawaller, W. 1995. Pseudoscorpions from Middle Asia, Part 4 (Arachnida: Pseudoscorpiones). Stuttg. Beitr. Naturk., (A) 522, 1–24.

Harvey, M. S. 1992. The phylogeny and classification of the Pseudoscorpionida (Chelicerata: Arachnida). Invert. Taxon., 6: 1373–1435.

Harvey, M. S. 2013. Citing online sources: Pseudoscorpions of the World, version 2.00, Western Australian Museum. Internet: http://www.museum.wa.gov.au/arachnids/pseudoscorpions/[accessed 14 December 2014].

Harvey, M. S., Ratnaweera, P. B., Randeniya, P. V. & Wijesinghe, M. R. 2012. A new species of the pseudoscorpion genus *Megachernes* (Pseudoscorpiones: Chernetidae) associated with a threatened Sri Lankan rainforest rodent, with a review of host associations of *Megachernes*. J. Nat. Hist., 46: 2519–2535.

Judson, M. L. I. 1990. Redescription of the bee-associate *Ellingsenius fulleri* (Hewitt and Godfrey) (Arachnida, Chelonethi, Cheliferidae) with new records from Africa, Europe and the Middle East. J. Nat. Hist., 24: 1303–1310.

Judson, M. L. I. 2007. A new and endangered species of the pseudoscorpion genus *Lagynochthonius* from a cave in Vietnam, with notes on chelal morphology and the composition of the Tyrannochthoniini (Arachnida, Chelonethi, Chthoniidae). Zootaxa, 1627: 1–56.

Krumpál, M. 1984. Einige bemerkenswerte Pseudoscorpione aus der UdSSR. Acta Ent. Bohemoslavaca, 81: 63–69.

Mahnert, V. 1974. *Roncus viti* n. sp. (Arachnida: Pseudoscorpiones) aus dem Iran. Ber. Naturw.-med. Ver. Innsbruck, 61: 87–91.

Nassirkhani, M. & Takallou zade, H. M. 2012. First report of two species of false-scorpions (Pseudoscorpions-Arachnida) from Kerman province. 17th national & 5th international biology conference; September 2012; Kerman, Iran. [Ar. Code: IBC17thP3204T001-2]

Nassirkhani, M. & Takkalloo zade, H. M. 2013a. The first record of *Gobichelifer chelanops* (Pseudoscorpiones: Cheliferidae) from Iran. Acta Arachnol., 62: 13–18.

Nassirkhani, M. & Takkallo zade, H. M. 2013b. The first report of *Dactylochelifer spasskyi* Redikorzec (Pseudoscorpiones: Cheliferidae) from Iran. J. Ent. Res., 4: 335–340.

Nassirkhani, M. & Vafai Shoushtari, R. 2014. Two new records of the genus, *Dactylochelifer* Beier (Cheliferidae: Pseusoscorpiones: Arachnida) from Iran. Acta Soc. Zool. Bohemicae, 78: 219–227.

Redikorzev, V. V. 1918. Pseudoscorpions nouveaux. I. Ezhegodnik Zool. Muzeya, 22: 91–101.

Redikorezev, V. V. 1949. Pseudoscorpions of Central Asia. Travaux de l'Institut de Zoologie de l'Académie des Science de l'URSS, 8: 638–668. (in Russian)

Received January 13, 2015 / Accepted March 17, 2015